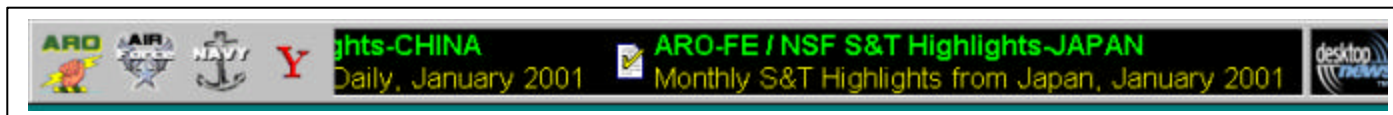




- Web-Page: <http://www.arofe.army.mil/AROindex.htm> ; WEB Info: [DAndreaG@arofe.army.mil](mailto:DAndreaG@arofe.army.mil)
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## INTRODUCTION

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## WASTEWATER TREATMENT

by UV and Fe Catalyst

*This paper was translated, for Dr. Russell S. Harmon of U.S. Army Research Office in Research Triangle Park, NC, by Dr. Takao Miyata of ARO-FE.*

Miyama Corporation (Tanbajima 1-1-12, Nagano City, Japan Tel / Fax +81-26-285-4166 /-0011, <http://www.miyama.net>) has developed ground water and wastewater treatment systems which use UV and Fe catalyst as an oxidant.

For wastewater treatment, similar technologies use UV, oxidant and Ozone, but all of them employ very large and high operating cost. Fenton's method, using ion complex, is well known as wastewater treatment method for organic pollution, but it produces large amounts of sludge and the reaction control is very difficult.

The new process developed by Miyama uses a special Fe catalyst and can control Fe concentration. Oxidation reaction proceeds very effectively and minimizes the sludge production. As the combination of UV, Oxidant and Fe catalyst have the strong oxidation efficiency, this process can be applied to treat pollutants, which are very difficult to decompose.

Miyama's system is smaller and approx. 30% less costly than the existing systems. In addition, it is inexpensive to operate (40% lower than its competitors), and its performance in the "decomposition rate of pollutants" is excellent (99.9%).

### Basic theory

$H_2O_2 + Fe$  (Fe Catalyst)  $\rightarrow 2OH?$  (Hydroxyl Radical)

$H_2O_2 + UV$  (Ultra Violet Light)  $\rightarrow 2OH?$  (Hydroxyl Radical)

Chlorinated Organic Solvent +  $2OH?$   $\rightarrow$  Intermediate Product (Chlorinated Acetic Acids)  
 $\rightarrow CO_2 + H_2O + Cl$

### Flow Scheme of the Process

Waste Water  $\rightarrow$  Add Oxidant  $\rightarrow$  Fe Catalyst  $\rightarrow$  UV irradiation  $\rightarrow$  Neutralize  $\rightarrow$  Discharge

### Materials to be treated

Decomposition of Chlorinated Organic solvent in Ground Water

Treatment of Heavy metals in Ground Water

Wastewater treatment including Organic difficult to treat, Chelate compound and Detergents

### Application

Waste treatment Facility for Ground water

Waste treatment Facility for Waste Liquid and wastewater from the factory

Waste treatment Facility for Waste liquid from Laboratory

Higher treatment Facility for Industrial water

Waste treatment Facility for Leach liquor from Wastewater treatment facility

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